

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number
WO 2004/014813 A3

(51) International Patent Classification⁷: **C03C 17/00**,
17/30, B32B 17/06, C09K 21/00, C01B 33/32

(21) International Application Number:
PCT/GB2003/003434

(22) International Filing Date: 6 August 2003 (06.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0218672.4 10 August 2002 (10.08.2002) GB

(71) Applicant (for all designated States except US): **PILK-
INGTON PLC** [GB/GB]; Prescot Road, St. Helens,
Merseyside WA10 3TT (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HOLLAND, John**,
Richard [GB/GB]; 36 Brick Kiln Lane, Rufford Ormskirk,
Lancashire L40 1SZ (GB). **HOLDEN, David, William**
[GB/GB]; 8 Milton Grove, Orrell, Wigan, Greater Man-
chester WN5 8HP (GB). **BOND, Stephen, Ian** [GB/GB];
12 Shaftesbury Way, Burtonwood, Warrington, Cheshire
WA5 4LB (GB). **VARMA, Karikath, Sukumar** [GB/GB];
54 Palace Road, Birkdale, Southport, Merseyside PR8 2BE
(GB).

(74) Agents: **HALLIWELL, Anthony, Charles et al.**; Group
Intellectual Property Department, Pilkington plc, Pilkington
European Technical Centre, Hall Lane, Lathom, Orms-
kirk, Lancashire L40 5UF (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(88) Date of publication of the international search report:
25 March 2004

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: CLEAR STABLE AQUEOUS SOLUTION BASED UPON WATERGLASS FOR THE PRODUCTION OF FIRE RE-
SISTANT GLAZING

(57) Abstract: Fire resistant glazings comprise a fire resistant interlayer based upon a silicate waterglass are characterised by the
incorporation of aluminium ions. The aluminate is incorporated as a solution which has been partially neutralised using a hydroxy-
carboxylic acid which is preferably citric acid. The incorporation of aluminium provides glazings have improved fire resistance and
impact properties

WO 2004/014813 A3

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/03434

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C03C17/00 C03C17/30 B32B17/06 C09K21/00 C01B33/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C03C B32B C09K C01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02 24445 A (PILKINGTON PLC ;HOLDEN DAVID WILLIAM (GB); HOLLAND JOHN RICHARD (G) 28 March 2002 (2002-03-28) page 1, paragraph 1 page 2, paragraph 3 -page 4, paragraph 3; claims 1-13; example 1 ---	1-22
Y	WO 01 70495 A (PILKINGTON PLC ;HOLDEN DAVID WILLIAM (GB); HOLLAND JOHN RICHARD (G) 27 September 2001 (2001-09-27) page 1, paragraph 1 page 2, paragraph 2 -page 5, paragraph 6; claims 1-23; examples 1-15 --- -/--	1-22

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- 'A' document defining the general state of the art which is not considered to be of particular relevance
- 'E' earlier document but published on or after the international filing date
- 'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- 'O' document referring to an oral disclosure, use, exhibition or other means
- 'P' document published prior to the international filing date but later than the priority date claimed

- 'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- 'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- 'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- '&' document member of the same patent family

Date of the actual completion of the international search

3 February 2004

Date of mailing of the international search report

2.02.04

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Maurer, R

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB 03/03434

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SAIDEN CHEM KK: "WPI WORLD PATENT INFORMATION DERWENT, DERWENT, GB", WPI WORLD PATENT INFORMATION DERWENT, DERWENT, GB, VOL. 1976, NR. 31 XP002151356 abstract ---	1-22
Y	US 4 190 698 A (BAUDIN POL ET AL) 26 February 1980 (1980-02-26) column 1, line 13-68 column 2, line 11-17 column 2, line 67 -column 3, line 8 column 4, line 7-20; claims 1-6 ---	1-22
A	WO 01 10638 A (PILKINGTON PLC ;HOLDEN DAVID WILLIAM (GB); HOLLAND JOHN RICHARD (G) 15 February 2001 (2001-02-15) page 2, paragraph 3 -page 3, paragraph 5; claims 1-18 ---	1-22
Y	GB 2 226 024 A (TIOXIDE GROUP PLC) 20 June 1990 (1990-06-20) page 2, line 1 -page 4, line 4; claims 1-31; examples 1-11 ---	23-27
Y	US 5 216 100 A (GRONDIN HENRI ET AL) 1 June 1993 (1993-06-01) column 2, line 54 -column 3, line 59; claims 1-8 -----	23-27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 03/03434

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-22

I) 1st invention

The subject-matter of independent claims 1, 17,21,22 and respective dependent claims is concentrated on a clear, stable, aqueous solution based on waterglass and on uses of said solution as glazing. The core of the invention provides a solution wherein aluminate + hydroxy carboxylic acid is mixed with waterglass in order to improve the fire-resistance and the mechanical impact resistance properties of the glazing composition.

2. Claims: 23-27

II. 2nd invention

The subject-matter of independent claim 23 and the respective dependent claims is concentrated on a clear, stable solution comprising water soluble aluminate, hydroxy carboxylic acid and a polyhydroxy compound. The core of the invention provides a stable aluminate solution.

INTERNATIONAL SEARCH REPORT

ation on patent family members

Internatic Application No

PCT/GB 03/03434

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0224445	A	28-03-2002	AU 8787301 A	02-04-2002
			CN 1468170 T	14-01-2004
			CZ 20030779 A3	17-09-2003
			EP 1322465 A1	02-07-2003
			WO 0224445 A1	28-03-2002
			HU 0301125 A2	28-10-2003
			US 2003186063 A1	02-10-2003
WO 0170495	A	27-09-2001	AU 4087501 A	03-10-2001
			BR 0109314 A	17-12-2002
			CA 2402990 A1	27-09-2001
			CN 1422210 T	04-06-2003
			EP 1274569 A1	15-01-2003
			WO 0170495 A1	27-09-2001
			HU 0300026 A2	28-06-2003
			JP 2003528020 T	24-09-2003
			NO 20024447 A	04-11-2002
			US 2003180543 A1	25-09-2003
US 4190698	A	26-02-1980	GB 1604388 A	09-12-1981
			AT 386125 B	11-07-1988
			AT 561978 A	15-12-1987
			AU 522172 B2	20-05-1982
			AU 3827678 A	31-01-1980
			BE 869063 A1	18-01-1979
			CA 1148798 A1	28-06-1983
			CH 633480 A5	15-12-1982
			DE 2833718 A1	15-02-1979
			DK 325578 A ,B,	04-02-1979
			FI 782292 A ,B,	04-02-1979
			FR 2399513 A1	02-03-1979
			IE 47303 B1	22-02-1984
			IT 1108667 B	09-12-1985
			JP 1359121 C	13-01-1987
			JP 54036096 A	16-03-1979
			JP 61024181 B	10-06-1986
			NL 7807867 A ,C	06-02-1979
			NO 782509 A ,B,	06-02-1979
			SE 426040 B	06-12-1982
			SE 7808005 A	04-02-1979
WO 0110638	A	15-02-2001	AU 6454900 A	05-03-2001
			EP 1206349 A1	22-05-2002
			WO 0110638 A1	15-02-2001
			JP 2003506305 T	18-02-2003
GB 2226024	A	20-06-1990	CA 2002792 A1	16-06-1990
			DE 3941337 A1	21-06-1990
			NO 895037 A ,B,	18-06-1990
			US 5089149 A	18-02-1992
US 5216100	A	01-06-1993	FR 2658095 A1	16-08-1991
			AT 151783 T	15-05-1997
			CA 2031485 A1	19-06-1991
			DE 69030491 D1	22-05-1997
			EP 0438949 A2	31-07-1991